WORK PLAN

SUPPLEMENTAL SAMPLING – 2021
CHURCH HOUSE BRANCH (AOC B)

International Paper Company
Closed Former Wood Treating Site Units
Wiggins, Mississippi
MSD 980 600 084

PREPARED FOR:	International Paper Company 6400 Poplar Avenue Memphis, Tennessee US EPA Region 4
COPY TO:	Mississippi Department of Environmental Quality
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INTRODUCTION

On April 6, 2021, representatives from the U.S. Environmental Protection Agency (EPA), Mississippi Department of Environmental Quality (MDEQ), and International Paper Company (IP) conducted a site visit/walk along Church House Branch (CHB) (AOC B), adjacent to the Closed Former Wood Treating Site Units in Wiggins, Mississippi (Wiggins facility). This Work Plan was prepared to memorialize the sampling plan which was mutually developed and agreed upon during the April 6, 2021 site visit/walk. The proposed scope of work, when accepted by EPA, will be conducted under EPA HSWA Permit No. MSD 980 600 084, effective January 4, 1993.

On October 7, 2020, IP received EPA's September 24, 2020 review comments on the *Supplemental Corrective Measures Study,* dated February 21, 2017, which included an *Ecological Risk Assessment Screening* report as Attachment B. Prior Supplemental Corrective Measures Study work was conducted in the time period of 2015-2016 to evaluate potential ecological risk assessment concerns identified in the CHB.

The location of the IP Wiggins facility and CHB are shown on **Figure 1**. A summary of the proposed sampling activities is contained in this Work Plan as well as documented in the following attachments, and the procedures described in the May 21, 2015 Supplemental Corrective Measures Field Sampling Plan - SWMU 37 Drainage Ditches & AOC B Church House Branch (*CMS Field Sampling Plan, 2015*).

Table 1. **Proposed Sampling Program Summary**
Figure 1. **Proposed Sampling Locations**
USEPA September 24, 2020 Review Comments (incorporated by reference)

BACKGROUND

EPA's September 24, 2020 review memorandum indicated that dioxins/furans in sediment appeared to potentially pose risks to ecological receptors in CHB, however this potential risk area was determined by EPA to be limited to the vicinity of Sediment Sample SD-3 (see following **Figure A** from the EPA memo for this location). The review memo concluded with the following recommendations:

> ***EPA Recommendations for Further Assessment/Risk Estimate Refinement***
>
> *Considering the risk estimates around location SD-3, I would recommend considering the following actions for refining the risk estimates:*
>
> - *Additional sediment sampling in Church House Branch between Ditch 4 outfall and SD-5 to better delineate the extent of dioxin/furan contamination in the sediments, in the creek and also in the ponded area*
> - *Collection of fish and invertebrates (and plants?) from the creek/pond area between Ditch 4 outfall and SD-5 to measure the dioxin contamination in the tissues, to provide better data for use in the risk calculations*
> - *Also potentially consider collecting information from the Ditch 4 to SD-5 stretch of the creek that could be used to assess the potential for natural attenuation/recovery regarding the dioxin contamination*

(Figure A is from the USEPA Memorandum dated September 24, 2020)

WORK PLAN

During the April 6, 2021 site walk, a plan was developed to address the concerns presented in the EPA review memo. Sampling locations were selected based on field conditions and in consultation with EPA's Project Manager and EPA's and IP's Ecological Risk Assessors. The EPA PM and MDEQ representatives observed site conditions and the EPA's Ecological Risk Assessor observed site conditions via "Facetime" phone calls. CHB conditions were inundated with water on April 6. The CHB water depths in braided channels were variable, with depths of approximately 0.5 to at least 3 feet. There were two ponded areas observed on April 6. The first ponded area was upgradient of the Ditch 4 Outfall to CHB, at the former sediment location SD-2. This ponded area was estimated on April 6 to be approximately one quarter acre in size, with water depths of approximately 0.5 to 2 feet. A second ponded area was observed between former sediment location SD-3 and former sediment location SD-4 (Figure 1). This larger ponded area was estimated to be approximately 2 acres in size on April 6. Vegetation of the area indicated that the pond water levels were elevated on April 6 given recent rainfall. The pond appeared wadeable, with depths considered likely less than 3 feet given the topography of the area, but it is possible that depths greater than 3 feet may exist in the center of the ponded area. Fish minnows and crayfish were observed in the pond area between former sediment locations SD-3 and SD-4. Crayfish burrows were observed along the braided channels and near the ponded areas.

The ponded area between former sediment locations SD-3 and SD-4 is the area of primary interest to EPA given the previous sediment sample results for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/F). This work plan proposes the collection of sediment, fish, and sediment dwelling invertebrates from locations in the ponded area between sediment locations SD-3 and SD-4, as well as locations downgradient from the pond and within site influence, and

from background areas that are upgradient from site influence. The collection of fish will depend upon conditions at the time of sampling, as fish may only be present in the ponded area.

Sediment and tissue samples will be collected from the following locations along the CHB and as shown on **Figure 1**. Sample details are summarized in **Table 1**. Protocols for the collection of sediment samples will follow the previously approved *CMS Field Sampling Plan, 2015* for CHB sample collection, laboratory analyses and Quality Assurance/Quality Control (QA/QC). Details for tissue sampling are contained in the next Section of this Work Plan.

Sample Location	**Sample Type**
Background (BG-1) (Upgradient)	Sediment, Fish, Invertebrates
Background Northeast Pond (NEP-1) (Along Tributary to CHB NE of facility)	Sediment, Fish, Invertebrates
SD-3.5 (Between former sample SD-3 and Pond)	Sediment, Fish, Invertebrates
SD-5.5 (Between former samples SD-5 and SD-6)	Sediment, Fish, Invertebrates
Pond Sample 1 (PS-1)* (North Pond Transect)	Sediment, Fish, Invertebrates
Pond Sample 2 (PS-2* (Middle Pond Transect)	Sediment, Fish, Invertebrates
Pond Sample 3 (PS-3)* (South Pond Transect)	Sediment, Fish, Invertebrates

Pond Samples 1, 2, 3 – Sediment samples will be a single composited sample consisting of four sample aliquots across a transect at the north, middle and south portions of the pond. Aliquot sample depth will be 0-0.5 foot (see **Figure 1). Fish and Invertebrate samples at these locations will consist of composite samples collected generally across the same transects, using methods described further in this Work Plan.*

Sediment samples will be submitted to SGS AXYS Analytical Services (SGS AXYS) for Polychlorinated dibenzo-p-dioxins and furans (PCDD/F) analysis via EPA Test Method SW-846 - 8290. In addition, the sediment samples will be analyzed for Total Organic Carbon (TOC) by EPA Test Method 9060, and Grain Size by ASTM Method E112-13. QA/QC samples will be collected, including one field duplicate, one field blank, and one matrix spike/matrix spike duplicate for Dioxin and TOC analysis. Tissue samples will be submitted to SGS AXYS for Dioxin analysis via EPA Test Method SW-846 – 8290, and Lipids via SGS AXYS SOP SLA-020 as summarized in **Exhibit 1-1** below.

Exhibit 1-1. Sediment and Tissue Analytical Methods

Analyte	**Laboratory Method**
Sediment Samples	
TOC	EPA 9060
PCDD/F	EPA 8290
Grain Size	ASTM Method E112-13
Tissue Samples (Fish and Sediment Invertebrates)	
Lipids	Axys SOP SLA-020
PCDD/F	EPA 8290

SOP – Standard operating procedure
PCDD/F - Polychlorinated dibenzo-p-dioxins and furans

Biological Tissue Sampling – Fish and Sediment Dwelling Invertebrates

Fish and sediment dwelling invertebrates will be collected for the locations identified in **Figure 1** and **Table 1**, as described below. It is anticipated that fish may be difficult to collect in some areas of CHB because the aquatic habitat is limited. The available fish and sediment dwelling invertebrate tissues collection effort will be considered successfully completed with a maximum of 3-days of collection efforts. If there are locations where fish and/or sediment dwelling invertebrates cannot be collected during the 3 days of field effort, those locations will be considered *de minimis* in terms of ecological exposure and risks due to limited habitat.

Fish sample collection will target sunfish, such as bluegill, a small home range forage fish which should be characteristic of the habitat in CHB and the likely prey of fish-eating wildlife, such as green heron and raccoons. A composite fish sample will be collected from each of the locations identified in **Figure 1** and **Table 1**.

- Fish will be collected using a backpack electroshocker to the extent possible.
- Baited fish traps, overnight gill nets having 1.5 to 3-inch mesh, and multi-hooked nightlines (trotlines) will be used to supplement electrofishing effort(s) if needed.
- The fish for an individual composite sample will be 2 to 5 individual fish of the same species, and the smallest fish of the composite sample will measure within 75% of the length of the longest fish of the composite sample.
- Reproductively mature sunfish will be collected, if possible.
- Fish for each composite sample will be weighed, length measured, and photographed.
- A minimum of 20 grams of fish will be considered a complete sample.

The sampling of sediment dwelling organisms will target crayfish, but other sediment dwelling organisms may be included if crayfish are not available.

- Crayfish will be collected by hand, using dip nets, or using baited minnow traps.
- Crayfish may also be collected opportunistically using the electroshocker if seen during the fish collection effort.
- Each composite crayfish sample will require at least 10 grams of tissue, with 20 grams of tissue or more preferred.
- The number and length of each crayfish in each composite sample will be recorded and composite samples will be photographed.

Whole-body fish composite samples and crayfish composite samples will be wrapped in aluminum foil (dull side against the sample), each individual sample will be placed into a Ziploc bag, and labelled with project name, sample identification, number of fish or invertebrates per composite, sample date and time, and the analyses requested. Samples will then be double bagged to preserve the labels from water damage. The double-bagged samples will be frozen, if possible, prior to shipment via federal express to the analytical laboratory lab. Fish samples will be shipped on wet ice to the analytical laboratory unless dry ice is available for shipment.

The analytical laboratory will process the whole-body composite fish samples and composite sediment dwelling organisms for analyses. Tissue samples will be analyzed for PCDD/Fs and lipids. Results will be reported in dry weight.

REPORT

A written report of results will be provided to EPA. The report will include documentation of sampling data, analytical results, data validation, and ecological risk screening. In order to expedite EPA's review of the results, draft tables of screening results will be emailed to EPA prior to submittal of the full report.

SCHEDULE

It is anticipated that the IP sampling team will mobilize to conduct the additional sampling within one to two-weeks of EPA's acceptance of this Work Plan.

REFERENCES

Review of Supplemental Corrective Measures Study Letter report and Ecological Risk Evaluation for the International Paper Site in Wiggins, MS, EPA, September 24, 2020.

Supplemental Corrective Measures Study – 2016, International Paper – Closed Former Wood Treating Site Units, Wiggins, MS, HW Permit 980 600 084, February 21, 2017.

Supplemental Corrective Measures Study Report, Closed Former Wood Treating Units, International Paper Company, Wiggins, MS, EPA HSWA Permit No. HW-980-600-084, August 2015.

Supplemental CMS Field Sampling Plan, SWMU 37 Drainage Ditches & AOC B Church House Branch, Former Wood Treating Units, International Paper Company, Wiggins, MS, EPA HSWA Permit No. HW-980-600-084, May 21, 2015.

Preliminary Corrective Measures Study Report, International Paper Treated Wood Products Plant. Wiggins, MS, EPA ID No. MSD 980 600 084, November 7, 2005.

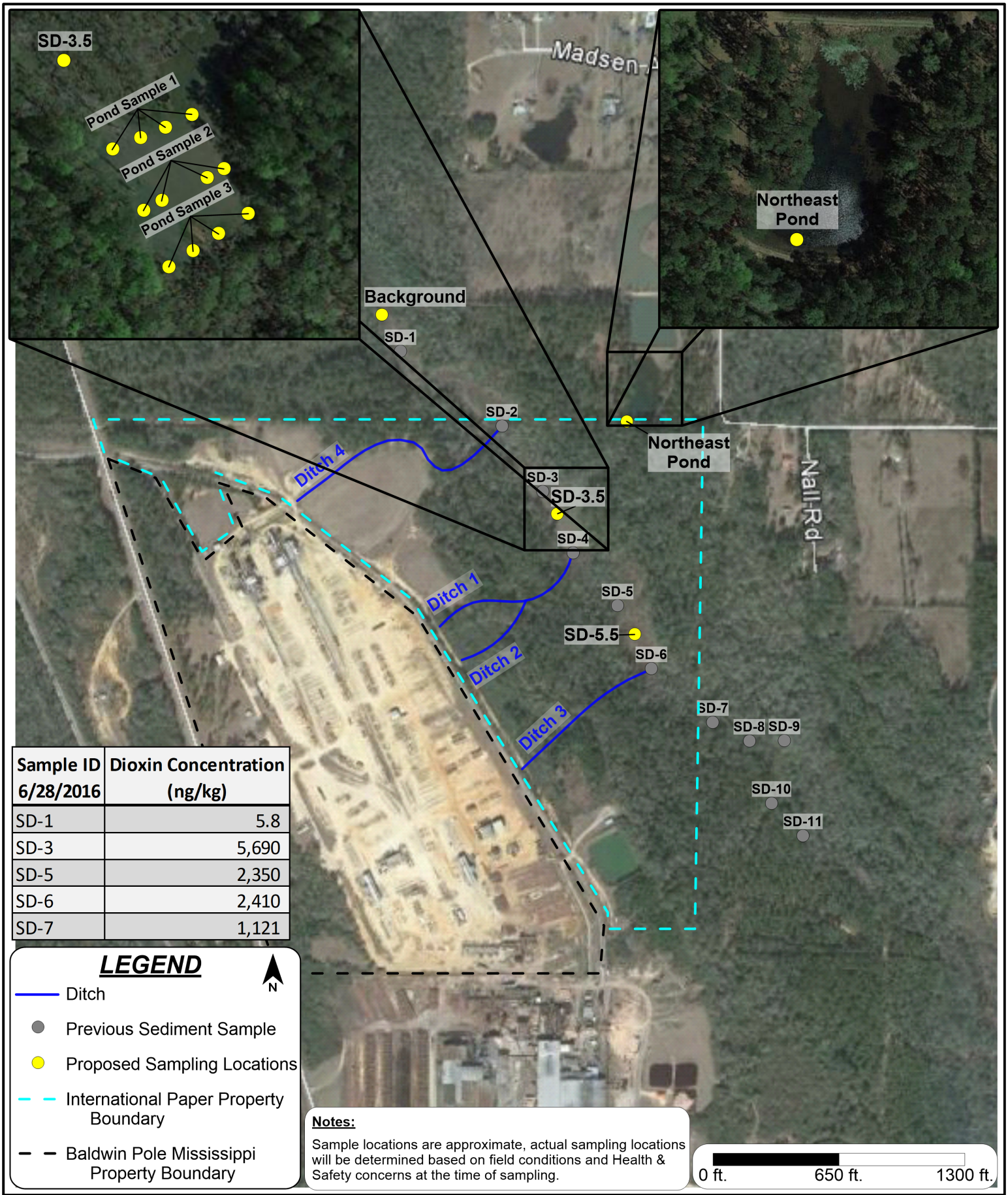
RCRA (HSWA) Permit MSD 980 600 084, International Paper, Wiggins, MS, January 4, 1993.

Table 1 Proposed Sampling Program Summary

Work Plan – Supplemental Sampling -2021 - Church House Branch (AOC B)
International Paper Company
Closed Former Wood Treating Site Units
Wiggins, Mississippi
IP Wiggins, MS - MSD 980 600 084

Sample Location	Sample ID	Sample Type/Matrix	Laboratory Analysis
Background (Upgradient)	BG-1	Sediment	8290, 9060, E112-13
		Fish Tissue	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue	8290, SGS AXYS SOP SLA-020
Background Northeast Pond (Along Tributary to CHB, NE of facility)	NEP-1	Sediment	8290, 9060, E112-13
		Fish Tissue	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue	8290, SGS AXYS SOP SLA-020
Between former location of sample SD-3 and Pond	SD-3.5	Sediment	8290, 9060, E112-13
		Fish Tissue (if present)	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue (if present)	8290, SGS AXYS SOP SLA-020
Between former location of samples SD-5 and SD-6	SD-5.5	Sediment	8290, 9060, E112-13
		Fish Tissue (if present)	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue (if present)	8290, SGS AXYS SOP SLA-020
Pond Sample #1 (North End of Pond)	PS-1	Sediment	8290, 9060, E112-13
		Fish Tissue	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue	8290, SGS AXYS SOP SLA-020
Pond Sample #2 (Middle of Pond)	PS-2	Sediment	8290, 9060, E112-13
		Fish Tissue	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue	8290, SGS AXYS SOP SLA-020
Pond Sample #3 (South End of Pond)	PS-3	Sediment	8290, 9060, E112-13
		Fish Tissue	8290, SGS AXYS SOP SLA-020
		Invertebrate Tissue	8290, SGS AXYS SOP SLA-020

Notes:
8290 - Polychlorinated dibenzo-p-dioxins and furans (PCDD/F) Analysis by EPA Test Method 8290.
9060-Total Organic Carbon Analysis by EPA Test Method 9060.
E112-13 - Grain Size Analysis by ASTM Method E112-13.
Tissue Samples (Fish and Sediment Invertebrates) - Analyzed for PCDD/F via 8290 and Lipids via GS AXYS SOP SLA-020.
Pond Samples 1, 2, 3 – Sediment samples will each be a composite sample consisting of four sample aliquots across a transect at the north, middle and south portions of the pond (see Figure 1).
Fish and Invertebrate samples at these locations will consist of samples collected generally across the same transects.
Sediment aliquot sampling depth will be approximately 0-0.5 foot.



Sample ID 6/28/2016	Dioxin Concentration (ng/kg)
SD-1	5.8
SD-3	5,690
SD-5	2,350
SD-6	2,410
SD-7	1,121

LEGEND

N

- Ditch
- Previous Sediment Sample
- Proposed Sampling Locations
- International Paper Property Boundary
- Baldwin Pole Mississippi Property Boundary

Notes:

Sample locations are approximate, actual sampling locations will be determined based on field conditions and Health & Safety concerns at the time of sampling.

0 ft. 650 ft. 1300 ft.

INTERNATIONAL PAPER

International Paper
Closed Former Wood TreatingUnits
Wiggins, MS

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Proposed Sampling Locations

DRAWN:	CHECKED:	DATE:	FIGURE:
LLT	NDK	04/09/2021	1